

What is claimed:

1. A beam splitter comprising a cholesteric layer.

2. The beam splitter according to Claim 1, wherein the
5 cholesteric layer is supported on a substrate.

3. The beam splitter according to Claim 1, further
comprising a prism having a diagonal, wherein the cholesteric
layer is supported on the diagonal of the prism.

4. The beam splitter according to Claim 1, further
comprising a substrate of neutral optical properties, wherein
the cholesteric layer is supported by the substrate.

5. The beam splitter according to Claim 1, further
comprising a first prism having a first diagonal and a second
prism having a second diagonal, wherein the first prism and the
second prism are abutted to each other along their diagonals,
and the cholesteric layer is disposed between the diagonals.

6. A beam splitter, comprising: a first prism having a
first diagonal;

a second prism having a second diagonal; and

a cholesteric layer disposed between the diagonals wherein the first prism and the second prism are abutted to each other along their diagonals at the cholesteric layer.

5 7. The beam splitter according to Claim 6, wherein the prisms are set in beam splitter pathlength matched positions.

10 8. The beam splitter according to Claim 6, wherein the cholesteric layer comprises a first color cholesteric layer and a second color cholesteric layer.

15 9. The beam splitter according to Claim 8, wherein the first color cholesteric layer comprises a blue cholesteric layer and the second color cholesteric layer comprises a red cholesteric layer.

20 10. The beam splitter according to Claim 8, wherein the first color cholesteric layer comprises a blue cholesteric layer and the second color cholesteric layer comprises a green cholesteric layer.

11. The beam splitter according to Claim 8, wherein the first color cholesteric layer comprises a green cholesteric

layer and the second color cholesteric layer comprises a red cholesteric layer.

12. The beam splitter according to Claim 8, wherein the
5 first color cholesteric layer comprises a blue cholesteric layer
and the second color cholesteric layer comprises a red
cholesteric layer.

13. The beam splitter according to Claim 8, wherein the
10 first color cholesteric layer comprises a blue cholesteric layer
and the second color cholesteric layer comprises a green
cholesteric layer.

14. The beam splitter according to Claim 8, wherein the
15 first color cholesteric layer comprises a green cholesteric
layer and the second color cholesteric layer comprises a red
cholesteric layer.

15. A prism assembly, comprising a set of optical
20 components including at least one cholesteric based beam
splitter.

16. The prism assembly according to Claim 15, wherein the
prism assembly is configured to split an input light beam into

at least 3 independent light channels, using only cholesteric based beam splitters.

17. The prism assembly according to Claim 15, wherein the cholesteric based beam splitter comprises a substrate and a cholesteric layer supported on the substrate.

18. The prism assembly according to Claim 15, wherein the cholesteric based beam splitter comprises a prism having a diagonal and a cholesteric layer is supported on the diagonal of the prism.

19. The prism assembly according to Claim 18, wherein the first color cholesteric layer comprises a blue cholesteric layer and the second color cholesteric layer comprises a red cholesteric layer.

20. The prism assembly according to Claim 18, wherein the first color cholesteric layer comprises a blue cholesteric layer and the second color cholesteric layer comprises a green cholesteric layer.

21. The prism assembly according to Claim 18, wherein the first color cholesteric layer comprises a green cholesteric

layer and the second color cholesteric layer comprises a red cholesteric layer.

22. The prism assembly according to Claim 15, wherein the prism assembly is part of a projection television.

23. The prism assembly according to Claim 15, wherein the set of optical components are set in prism assembly pathlength matched positions.

24. The prism assembly according to Claim 23, wherein the prism assembly is part of a Liquid Crystal on Silicon (LCOS) projection HDTV.

25. A prism assembly, comprising a set of beam splitters configured to split an incoming light beam into at least 3 different channels, wherein the beam splitters are constructed as pathlength matched beam splitters and the beam splitters are secured in prism assembly pathlength matched positions.

26. The prism assembly according to Claim 25, wherein at least one of the beam splitters comprise a cholesteric based beam splitter.

27. The prism assembly according to Claim 26, wherein the cholesteric based beam splitter is constructed as a pathlength matched beam splitter.

5 28. The prism assembly according to Claim 26, wherein:
the cholesteric based beam splitter comprises a first prism having a first diagonal and a second prism having a second diagonal;

10 the first prism and the second prism are abutted to each other along their diagonals; and

the cholesteric based beam splitter further comprises a cholesteric layer is disposed between the diagonals.

15 29. The beam splitter according to Claim 28, wherein the cholesteric layer comprises a blue cholesteric layer and a red cholesteric layer.

20 30. The beam splitter according to Claim 28, wherein the cholesteric layer comprises a blue cholesteric layer and a green cholesteric layer.

31. The beam splitter according to Claim 28, wherein the cholesteric layer comprises a green cholesteric layer and a red cholesteric layer.

32. The prism assembly according to claim 25, wherein at least one of the beam splitters is a polarizing beam splitter and at least one of the beam splitters is a cholesteric based beam splitter.

33. A quad style prism assembly, comprising:

an input beam splitter;

a first processing beam splitter comprising at least one processing face adaptable to a modulation device;

a second processing beam splitter comprising at least one processing face adaptable to a modulation device; and

an output re-combination beam splitter.

wherein at least one of the beam splitters comprise a cholesteric based beam splitter.

34. The quad style prism assembly according to Claim 33, wherein:

the cholesteric based beam splitter comprises a first prism having a first diagonal and a second prism having a second diagonal;

the first prism and the second prism are abutted to each other along their diagonals; and

the cholesteric based beam splitter further comprises a cholesteric layer is disposed between the diagonals.

35. The quad style prism assembly according to Claim 33,
5 wherein:

the input beam splitter comprises a dichroic beam splitter;
the first processing beam splitter comprises a polarizing
beam splitter;

the second processing beam splitter comprises a cholesteric
10 based beam splitter; and

the output re-combination beam splitter comprises a
polarizing beam splitter.

36. The quad style prism assembly according to Claim 35,
15 wherein:

the dichroic beam splitter comprises a Magenta dichroic
beam splitting element.

37. The quad style prism assembly according to Claim 35,
20 wherein the cholesteric based beam splitter comprises a dual
color cholesteric layer.

38. The quad style prism assembly according to Claim 37,
wherein the dual color cholesteric layer comprises a blue

cholesteric layer having a first handedness, and a red cholesteric layer having a second handedness opposite the first handedness.

5 39. The quad style prism assembly according to Claim 37, wherein the dual color cholesteric layer comprises a right hand blue cholesteric layer and a left hand red cholesteric layer.

10 40. The quad style prism assembly according to Claim 33, wherein:

the input beam splitter comprises a polarizing beam splitter;

the first processing beam splitter comprises a polarizing beam splitter;

15 the second processing beam splitter comprises a cholesteric based beam splitter; and

the output re-combination beam splitter comprises a polarizing beam splitter.

20 41. The quad style prism assembly according to Claim 40, wherein the dual color cholesteric layer comprises a blue cholesteric layer having a first handedness, and a red cholesteric layer having a second handedness opposite the first handedness.

42. The quad style prism assembly according to Claim 40,
wherein the dual color cholesteric layer comprises a blue
cholesteric layer having a first handedness, and a green
cholesteric layer having a second handedness opposite the first
handedness.

43. The quad style prism assembly according to Claim 41,
wherein the dual color cholesteric layer comprises a green
cholesteric layer having a first handedness, and a red
cholesteric layer having a second handedness opposite the first
handedness.

44. The quad style prism assembly according to Claim 33,
wherein adjacent beam splitters are liquid coupled.

45. The quad style prism assembly according to Claim 33,
further comprising a set of optical elements position between
interspersed between adjacent beam splitters.

46. The quad style prism assembly according to Claim 45,
wherein adjacent beam splitters and optical elements between the
adjacent beam splitters are liquid coupled.

47. The quad style prism assembly according to Claim 45, wherein the beam splitters are set in prism assembly pathlength matched positions.

5 48. The quad style prism assembly according to Claim 33, wherein at least one of the beam splitters is constructed as a pathlength matched beam splitter.

10 49. The quad style prism assembly according to Claim 33, wherein all of the beam splitters are cholesteric based beam splitters.

50. The quad style prism assembly according to Claim 33, wherein:

15 the input beam splitter comprises a first color cholesteric layer having a first hand direction;

 the first processing beam splitter comprises a cholesteric layer of the first color and having the first hand direction;

20 the second processing beam splitter comprises a second color cholesteric layer having the first hand direction and a third color cholesteric layer having a second hand direction opposite the first hand direction; and

 the output beam splitter comprises cholesteric layer of the first color having the first hand direction.

51. The quad style prism assembly according to Claim 50,
wherein the first color is green, the second color is blue, and
5 the third color is red.

52. The quad style prism assembly according to Claim 50,
wherein the first color is green, the second color is red, and
the third color is blue.

53. The quad style prism assembly according to Claim 50,
wherein the first color is blue, the second color is red, and
the third color is green.

54. The quad style prism assembly according to Claim 50,
wherein the first color is blue, the second color is green, and
the third color is red.

55. The quad style prism assembly according to Claim 50,
wherein the first color is red, the second color is blue, and
20 the third color is green.

56. The quad style prism assembly according to Claim 50, wherein the first color is red, the second color is green, and the third color is blue.

5 57. The quad style prism assembly according to Claim 50, wherein the first hand direction is a right hand direction, and the second hand direction is a left hand direction.

10 58. The quad style prism assembly according to Claim 50, wherein the first hand direction is a left hand direction, and the second hand direction is a right hand direction.

15 59. The quad style prism assembly according to Claim 50, wherein each beam splitter comprises a substrate configured to support the beam splitter's cholesteric layer.

20 60. The quad style prism assembly according to Claim 59, wherein the cholesteric layers are positioned in prism assembly pathlength matched positions.

61. The quad style prism assembly according to Claim 50, wherein:

at least one of the beam splitters comprises a first prism having a first diagonal and a second prism having a second

diagonal, the first diagonal adjacent to the second diagonal, and the cholesteric layer disposed between the diagonals.

62. The quad style prism assembly according to Claim 50,
5 wherein:

at least one of the beam splitters comprises a first prism having a first diagonal and a second prism having a second diagonal, the first diagonal adjacent to the second diagonal, and the cholesteric layer disposed between the diagonals; and

10 the cholesteric layer comprises a first color cholesteric layer disposed on the first prism diagonal, and a second color cholesteric layer disposed on the second prism diagonal.

63. The quad style prism assembly according to Claim 62,
15 wherein the first color cholesteric layer and the second color cholesteric layer have opposite handed directivities.

64. The quad style prism assembly according to Claim 50,
wherein the prism assembly is part of kernel in a Liquid Crystal
20 on Silicon projection monitor.

65. The quad style prism assembly according to Claim 64,
wherein the projection monitor is an HDTV.

66. A Liquid Crystal on Silicon (LCoS) High Definition monitor, comprising:

5 a Light Management System (LMS), comprising an LCoS based kernel having a prism assembly comprising a set of optical components including at least one cholesteric based beam splitter.

10 67. The Liquid Crystal on Silicon (LCoS) High Definition monitor according to Claim 66, further comprising any of a television receiver, DVD player, cable box, and other image source configured to provide image signals to the kernel.